بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

PREDICTION OF THE SUCCESS OF IN-VITRO FERTILIZATION PROGRAMME BY ASSESSMENT OF SPERM FUNCTION AND SPERM FERTILIZATION POTENTIAL

THESIS

Submitted in Partial Fulfillment of the Requirements of
the M.D Degree in Obstetrics and Gynaecology

By

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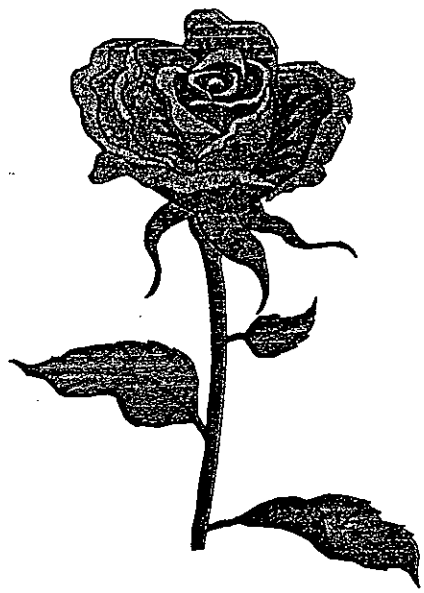


To my father

To my mother

To my devoted wife

To my lovely daughters;

Maiar and Mirna

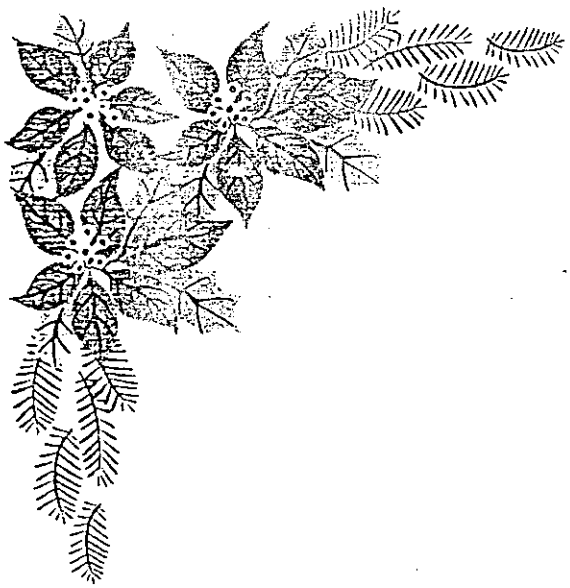
LIST OF ABBREVIATIONS

A23187	Calcium ionophore
ACTH	Adrenal Corticotropic Hormone
AI	Acrosomal Index
ALH	Amplitude Lateral Head
AMP	Adenosine Monophosphate
AR	Acrosome Reaction
ART	Assisted Reproductive Technology
BCF	Beat Cross Frequency
Ca^{2+}	Calcium
CASA	Computer Assisted Semen Analysis
CBAVD	Congenital Bilateral Absence of the Vas
cc	cubic centimeter
CFTR	Cystic Fibrosis Transmembrane conductance Regulator
CI	Confidence Interval
CT	Computerised Tomography
CTC	Chlortetracycline
DAZ	Deleted in Azoospermia
DNA	Desoxy Ribonucleic Acid
FF	Follicular Fluid.
FITC	Fluorescein Isothiocyanate
FR	Fertilization Rate.
FSH	Follicle Stimulating Hormone
GABA	γ-aminobutyric acid
GH	Growth Hormone
GIFT	Gamete intra-Fallopian transfer
GnRH	Gonadotrophins Releasing Hormone
hCG	Human Chorionic Gonadotrophins
HEPT	The Hamster Egg Penetration test
hMG	Human Menopausal Gonadotrophins

HOS	Hypo-Osmotic Swelling
HST	Hobson Sperm Tracker
HZA	Hemizona Assay
IBT	Immunobead Binding Test
ICSI	Intracytoplasmic Sperm Injection
IgA	Immunoglobulin A
IgG	Immunoglobulin G
IVF	In Vitro Fertilization
IVF-ET	In Vitro Fertilization and Embryo Transfer
LH	Lutinising Hormone
LIN	Linearity
LWH	Liverpool Women's Hospital.
mAb	Monoclonal Antibody
MESA	Microsurgical Epididymal Sperm Aspiration
MIST	Microinjection Sperm Transfer
MRI	Magnetic Resonance Image
mRNA	messenger Ribonucleic Acid
MSTL	Mean Sperm Tail Length
n	Number
°C	Degree Celsius
OCC	Oocyte-Cumulus Complex
PCC	Premature Chromosome Condensation
PCR	Polymerase Chain Reaction
PCT	Post-Coital Test
PESA	Percutaneous Epididymal Sperm Aspiration
PROST	Pronuclear Stage Tubal Transfer
PSA	Pisum Sativum Agglutinin
PZD	Parial Zona Dissection
RBM	RNA binding motif
RMU	Reproductive Medicine Unit
SAA-1	Sperm Acrosome Antigen-1

SD	Standard Deviation
SDI	Sperm Deformity Index
SFI	Sperm Fertility Index
SPA	Sperm Penetration Assay
SUZI	Sub-Zonal Insemination
TESA	Testicular Sperm Aspiration
TESE	Testicular Sperm Extraction
TET	Tubal Embryo Transfer
TSH	Thyroid Stimulating Hormone
TZI	Teratozoospermia Index
VAP	Velocity Average Path
VCL	Velocity Curvilinear
VSL	Velocity Straight-line
WHO	World Health Organisation
ZIFT	Zygote Intrafallopian Transfer
ZP	Zona Pellucida
ZRK	Zona Receptor Kinase

CONTENTS



REVIEW OF LITERATURE

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Physiology of fertilization and sperm-oocyte interaction

Historical view

Von Baer in 1828, made the first observation of a mammalian dog's egg. In 1839, the nature and the significance of the germ cells began to be understood when Schwann recognized the egg itself as a cell. Similarly, the cellular nature of sperm was determined by Schweigger-Siedel, followed in 1842 by Bischoff's drawings of rabbit ova and preimplantation embryos with sperm in the zona pellucida. In 1843, Barry illustrated ova in which sperm had penetrated the vitellus but the essential features of fertilization - that a single sperm enters the ovum and the nuclear material of sperm and ovum intermix - were still unknown. Another decade elapsed before Oscar Hertwig, in 1876, established that fertilization results from the union of the egg and sperm with each sex thus contributing one of its own cells to the new individual (Biggers, 1984).

In 1890, Walter Heape demonstrated that fertilized rabbit eggs could be flushed from the fallopian tube and transferred to a surrogate - the technique of embryo transfer. He also showed the possibility of embryo survival outside the reproductive tract, albeit briefly (Fishel, 1986).

Gregory Pincus first demonstrated that the oocytes of various animals would undergo maturation if liberated from their follicle and cultured in vitro (Pincus *et al.*, 1939). They attempted this with human oocytes, predicting the maturation period to be about 12 hours, an error not corrected until Edwards established the optimum time to be 37 hours in man, which is similar in pig and shorter in other farm

animals and primates (Edwards 1965a)& (Edwards 1965b). In early 1960, major developments had occurred in culture techniques for IVF and embryonic growth in vitro (Brinster, 1963).

The groundwork for human in vitro fertilization (IVF) was thus being started by the development in the field of human embryology and progressed by advances in surgery, especially in laparoscopic technique (Steptoe, 1969). Progression in the understanding of the roles of the pituitary gland in reproductive physiology led to the use of pituitary extracts to induce superovulatory responses in female animals. In 1957, superovulation resulting in greatly increased numbers of offspring was demonstrated in the adult mouse (Fowler *et al.*, 1957). Pituitary extracts were used to induce superovulation in amenorrheic women and, later on, purified human menopausal gonadotrophins (hMG) and hCG were used for this purpose (Lunenfeld, 1969). The use of hMG and hCG, together with the knowledge of the timing of human oocyte maturation, allowed the collection of preovulatory human oocytes for IVF to be considered. Human fertilization in vitro using washed ejaculated sperm and oocytes matured in vitro was nevertheless attempted and first achieved in 1969, opening the way to study of embryonic growth (Edwards *et al.*, 1969).

In 1971, the first therapeutic replacement of embryos fertilized and cultured in vitro into an infertile woman with damaged tubes was performed, but these early transfers resulted in implantation failure (Edwards, 1973). A short-lived pregnancy was reported in 1973 (De Kretzer *et al.*, 1973) and an ectopic pregnancy in 1975 (Steptoe *et al.*, 1976) but Louise Brown, born in 1978, was the world's first successful IVF baby (Edwards *et al.*, 1980)& (Steptoe *et al.*, 1980).